Future Intelligent and Secure Vehicular Network Toward 6G: Machine-Learning Approaches

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Abstract

As a powerful tool, the vehicular network has been built to connect human communication and transportation around the world for many years to come. However, with the rapid growth of vehicles, the vehicular network becomes heterogeneous, dynamic, and large scaled, which makes it difficult to meet the strict requirements, such as ultralow latency, high reliability, high security, and massive connections of the next-generation (6G) network. Recently, machine learning (ML) has emerged as a powerful artificial intelligence (AI) technique to make both the vehicle and wireless communication highly efficient and adaptable. Naturally, employing ML into vehicular communication and network becomes a hot topic and is being widely studied in both academia and industry, paving the way for the future intelligentization in 6G vehicular networks. In this article, we provide a survey on various ML techniques applied to communication, networking, and security parts in vehicular networks and envision the ways of enabling AI toward a future 6G vehicular network, including the evolution of intelligent radio (IR), network intelligentization, and self-learning with proactive exploration.